Deep representations and exploiting the structure of the data

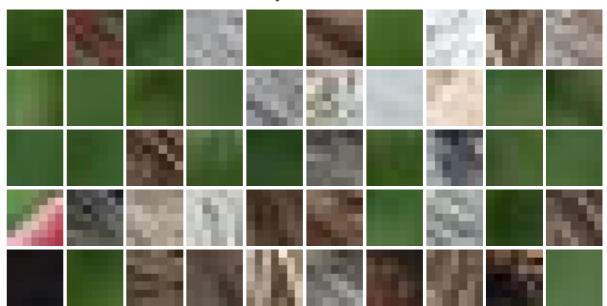
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Structure of input data

- Images
 - Repeating patterns
 - at various scales



7x7 patches



Structure of convolutional networks

• Exploit repeating structure of images

inception_4e unit 789 inception_4e unit 750 inception_5b unit 626





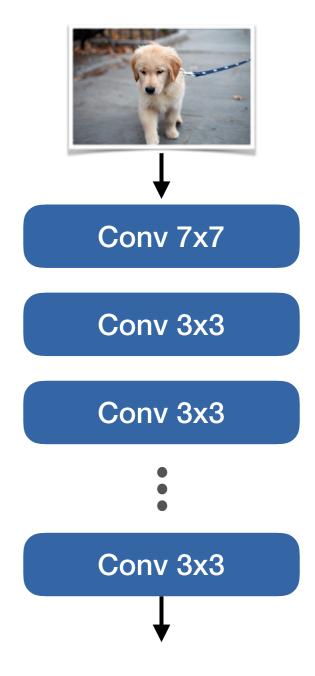
inception_4e unit 175 inception_4e unit 225 inception_5b unit 415



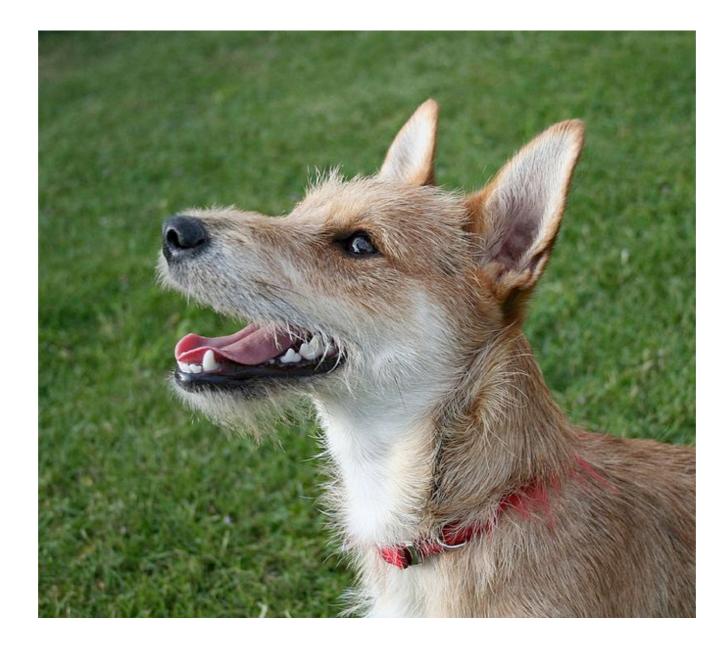




Network Dissection: Quantifying Interpretability of Deep Visual Representations, D. Bau etal, CVPR 2017

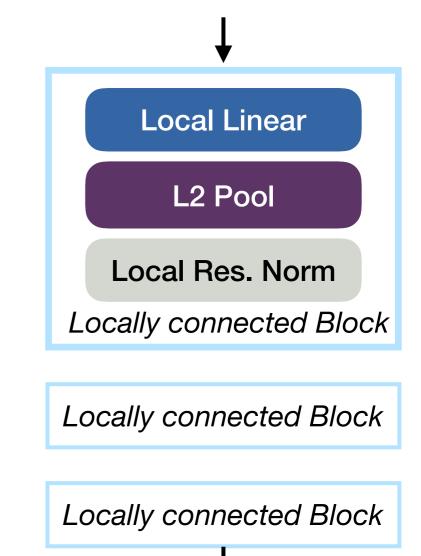


What do networks learn?



Linear layered networks do not work well on images

- Largest linear network for computer vision
 - Locally connected



Building high-level features using large-scale unsupervised learning, Q. Le etal, ICML 2012 Large Scale Distributed Deep Networks, J. Dean etal. NeurIPS 2012